the way of their gaining permanent popularity. The oleic acid odor which characterizes all the oleates is a decided disadvantage; it is peculiar, disagreeable, and cannot be covered up. Although apparently simple and easy of manufacture, yet a good preparation is not generally procurable, is in fact exceptionable. They are expensive and therefore unsuitable for dispensary and general use, as just as much in quantity, of the oleates or their ointments, is required, if properly used, as in the employment of other ointments. Further, while the most of the oleates, if rightly prepared, show very little tendency to decompose or to become rancid, this cannot be said of the commercial preparations usually met with. Lastly, the oleates, even when good preparations, will frequently prove irritating, and thus give rise to uncertainty as to effect. It is true the same may be said of simple lard or vaseline, but this occurs so rarely with these latter as to be exceptional; not so with the oleates.

In conclusion, it is difficult to place the status, present and future, of the oleates in cutaneous therapeutics, but from the observations of competent authorities in the past year or more, taken with the results of my own experience, and in view of their disadvantages as mentioned above, my conviction, provisionally stated, is that of all the oleates (those employed in diseases of the skin referred to) the oleate of mercury, the oleate that has been longest in use, is the only preparation that promises to hold a permanent place, and even that is likely to recede considerably from the prominence it held a few years ago.

ARTICLE XV.

THE CURE OF EXTRA-UTERINE FŒTATION BY ELECTRICITY. By HENRY G. LANDIS, A.M., M.D., Professor of Obstetrics and Diseases of Women in Starling Medical College.

IT may be regarded as an accomplished and proven fact that electricity in some form is a specific cure for extra-uterine pregnancy. It arrests the growth and destroys the vitality of the embryo and cyst, and its use is followed by a truly remarkable disappearance of all or the greater part of the growth in a short time. This at least is true when the electricity is used during the first half of the pregnancy. As we approach the period of viability in the child the risk of rupture of the cyst diminishes, and the propriety of surgical interference at or near term becomes greater.

Experience is lacking as to the comparative effect of laparotomy as contrasted with the retention of an electrically destroyed fœtus of large size. Nor are we likely to acquire such experience, for the child at or near term has acquired rights of existence which it did not have at an earlier period. The life of an extra-uterine fœtus at three months is worth next to nothing, because of the tremendous risks to which it as well as the mother is subject. At term the risks have mainly been passed, except such as are conquerable by abdominal surgery. For the present, then, we may limit the beneficent effects of electricity to the first half, or thereabouts, of the pregnancy.

The great advantages of the faradic current over all other forms of electricity have been hitherto pointed out. Its convenience and portability will continue to recommend it to the general practitioner as long as the present state of information in matters electrical obtains. One practical point in its use remains to be elucidated, and hitherto those who have had to use the battery have had to grope in the dark.

Shall we use a weak current for a long time, or a strong current briefly, and how many repetitions of the application are necessary? The published reports of cases, my own included, will show that on this point uncertainty has prevailed. To clear it up, if possible, I have conducted the following series of experiments. They are based upon the supposition that success is achieved by the death of the embryo; the *specific* value of the method being that the fœtus will surely be killed if it gets a large enough dose of the current. If a man is struck by lightning, he is certainly killed if the current is strong enough, otherwise he may recover, perhaps without injury. In operating upon an extra-uterine cyst, we remember that we have also a woman to deal with, and we must not kill two birds with one stone. Therefore, *a priori*, we would prefer to destroy the fœtus with mild currents, repeated as long and as often as necessary, if it can be done, rather than to endanger the mother by sharper shocks. There is also in the latter method a theoretical danger of causing rupture of the cyst, on account of the sudden spasm which a strong current may induce in its contractile envelope. Also the discomfort is very great when strong currents are used.

The experiments are also based upon the supposition that the fœtus is in the matter of vitality to be compared with some of the lower forms of life.

Insects were therefore first chosen. After a few unsatisfactory attempts upon flies, the following was conducted:—

Experiment I.—A large beetle (*Lucanus dama*), two inches long, was connected with the poles of a Fleming faradic battery. This battery was used in all the experiments, the poles (unless otherwise stated) being placed in one and four. The chitinous envelope of insects is a complete insulating material. The poles were therefore provided with large needles, and one needle being pushed into the beetle's mouth and œsophagus, the other was introduced into its anus and pushed into the abdominal cavity. The full strength of the battery was then turned on, the coil being completely uncovered. Such a current would be unendurable by a human being for more than a few seconds. The beetle at once presented the appearance of death (which it is not accustomed to feign), becoming motionless. The current was continued for *one hour*. It was then stopped, and the apparently dead beetle was placed on a table. On re-entering the room two hours later the beetle was found on the floor, running towards me in a lively manner, as if to ask for more.

This experiment was repeated and varied, but the upshot of them all was that the faradic current will not kill insects with any certainty.

The next series was performed upon fish, there being many points of resemblance and analogy between a young human fœtus and a fish. The species selected, *ex necessitate rei*, were minnows, probably of the genus *Hudsonius*. All American minnows, according to Jordan, are of feeble organization, and ought therefore to succumb readily to electricity. In conducting the experiments a minnow was placed in a china basin of water. The electrodes were then introduced into the water at some distance from the fish, one on each side. This was thought to be an essential feature in any course of experiments, since the fœtus also exists in a liquid, although its placental connection allows of some direct transmission of the current. It was soon found that the electrodes, or one of them, had to be brought quite near to the fish in order to overcome the resistance of the water unless a very powerful current was used.

Experiment II.—One minnow. Current 1–4 for ten seconds. The minnow turned over as if dead, but recovered slowly; in twenty minutes completely.

Experiment III.—Same minnow and another. Current for seventy seconds. Prompt suspension of animation, but both began breathing in one minute; in a half hour, irritation provoked voluntary movements, and they then swam about unconcerned.

Experiment IV.—Same minnows as in III. Current for three minutes. Minnow No. 1 dead. Minnow No. 2, gills moved feebly within one minute after the suspension of the current, and continued for ten minutes longer, after which death occurred.

These experiments were made with a very weak secondary current, and with the coil entirely covered. As far as they go they show that such a current has the power to tire out the animal if repeated sufficiently.

Experiment V.—Fresh minnow. Current 1–4, but with the coil uncovered, the most powerful attainable with this battery. Current for five seconds. Immediate arrest of respiration and apparent death, succeeded, after the removal of the current, by active but uncoordinated movements. Entirely restored in five minutes.

Experiment VI.—Same minnow; same current for one minute. Apparently instant death. Almost immediately after cessation of current the same movements as in IV. In five minutes completely restored.

Experiment VII.—Same minnow; same current for two minutes. Instant and permanent (!) death.

Experiment VIII.—Fresh minnow. Same current for two minutes. Instant cessation of respiration and death without recovery.

Experiments V. VI. VII. tend to show that even a powerful current needs to be repeated, or, judging from VIII., to be continued for a long time.

Experiment IX.—Fresh minnow; current 1–4, but with coil covered, for two minutes. Respiration did not cease entirely for one and three-quarter minutes, and in twenty-five seconds after cessation had recommenced. In one minute, more complete recovery

Experiment X.—Same minnow; four minutes later reapplied the same current for three minutes. Gills moving feebly during the entire application, and restoration complete in fifteen minutes.

Experiment XI.—Same minnow; sixteen hours later. Very active. Applied same current as in IX. and X. for four minutes. Death prompt and complete.

Although the current 1–4 with coil covered is a very moderate one, the battery will give still feebler ones. A single experiment is sufficient to demonstrate their inutility.

Experiment XII.—Fresh minnow; current 1–6 for ten minutes; without apparent effect of any kind. Current suddenly changed to 1–4 and continued for one minute. Apparent death almost at once. Respirations began almost immediately after the removal of the current. Full recovery in a few minutes.

Experiment XIII.—Same minnow; current 1–4, three minutes. Death.

Experiment XIV.—Fresh minnow; current 1–4, for ten minutes. Perhaps from superior strength it was not much affected for two minutes and forty-five seconds. It then turned over, and the gills moved feebly during the rest of the application. As soon as the current was removed, it righted at once, but continued feeble and sluggish for seven minutes, then recovering completely.

Experiment XV.—Same minnow; fifteen minutes later; quite brisk. Same current for one minute. Profound quiet for the first three-quarters of the minute, respiration beginning feebly at that time. Completely restored in five minutes.

Experiment XVI.—Same minnow; shortly after recovery. Same current for three minutes. Very little affected.

Experiment XVII.—Same minnow; five minutes later. Full current, coil uncovered, for three minutes. Respiration continuous throughout the application, though feeble, and the minnow turned over at once. In thirty minutes was swimming about, but an occasional lurch betrayed weakness. Was placed in the aquarium with untouched minnows, but died during the night.

The general harmony of these observations with clinical experience is remarkable. Life (at this level) may apparently be destroyed at once, but in reality is only suspended, and repeated shocks are necessary. It reminds one of the nine lives of a cat.

I made no experiments upon pregnant mammals, because the presence of the uterus necessarily vitiates the result. The current induces uterine contraction; this causes compression of the placental circulation at least, and expulsion from the uterus if continued. Instead of this, new-born rabbits were selected as being very tender creatures, and likely to be easily influenced by the current.

Experiment XVIII.—Rabbit, a few hours after birth. Mild current for one minute, with little evidence of any inconvenience.

Experiment XIX.—Same rabbit; one inch of coil uncovered for thirty seconds, when the full force of the battery was turned on for thirty seconds. No apparent effect upon the animal, except in struggling to get away at the first. He was replaced in the pen and lived to grow up.

Experiment XX.—Rabbit from another litter. A few hours old. Its parent (or a rat) had removed one ear and the toes from the hind leg on opposite side. Full current for one minute. The animal seemed feeble afterwards.

Experiment XXI.—Same rabbit three minutes later. Full current for one and a half minutes; waited then for two minutes and reapplied current for three minutes. At the close it lay quiet, scarcely breathing, but reflexes were easily excited. It seemed cold, in part from the wetting with the sponge electrodes, though the day was hot. After warming it apparently recovered entirely in about ten minutes.

Experiment XXII.—Same rabbit thirteen minutes later; full current for five minutes. A few feeble respirations afterwards, but within five minutes was dead.

Experiment XXIII.—Another rabbit, also marked by loss of one ear. Full current for five minutes. Soon regained its former appearance and recovered.

In these experiments the electrodes were placed upon a shoulder and the opposite rump. In the second rabbit the current was in one application given through the wounded surfaces, but without special difference. The results were certainly unanticipated, and constitute further proof of the comparative immunity from electrical influence of the lower animals.

Conclusions.—I think we are warranted in drawing these conclusions from the facts observed:—

1. In using the faradic current in extra-uterine pregnancy, the applications should be protracted for an hour, if the patient can bear it.
2. The current should be repeatedly applied, in order that the vitality of the fœtus may be finally exhausted.
3. The current should for at least one sitting be used in great strength.
4. The current probably acts, not only by destroying the fœtus, but by its action upon the placental circulation; an additional reason for a long application.

ARTICLE XVI.

A NEW DISCISSION INSTRUMENT. By ALBERT G. HEYL, M.D., Ophthalmic Surgeon to the Episcopal Hospital, Philadelphia.

A COMPARATIVELY large number of operations have been devised for making an opening in the capsular or capsulo-lenticular structures so often found after cataract extractions. They may be classified as follows: 1. Those in which an opening is made in the cornea large enough to admit of the direct manipulation of the membrane; *e. g.*, the Wecker operation, with *pince-ciseaux*, the similar one of A. Weber, the Noyes operation with Graefe knife and blunt hook. 2. Those in which the capsule is acted on through the medium of the cornea. Such are the various needle operations. This method of operating is much less rough than the former, and therefore much to be preferred if it can be made effective.

To accomplish this result it is necessary to bear in mind the conditions under which the operation is made. The object is to make a hole of sufficient size for useful vision in a membrane of varying density and more or less yielding; this is to be accomplished by an instrument which must